

Monthly Marine Biotoxin Report

August 2004

Technical Report No. 04-22

INTRODUCTION:

This report provides a summary of biotoxin activity for the month of August 2004. Ranges of toxin concentrations are provided for the paralytic shellfish poisoning (PSP) toxins and for domoic acid (DA). Estimates are also provided for the distribution and relative abundance of *Alexandrium*, the dinoflagellate that produces PSP toxins, and *Pseudo-nitzschia*, the diatom that produces domoic acid. Summary information is also provided for any quarantine or health advisory that was in effect during the reporting period.

Please note the following conventions for the phytoplankton and shellfish biotoxin distribution maps: (i) All estimates for phytoplankton relative abundance are qualitative, based on sampling effort and percent composition; (ii) All toxin data are for mussel samples, unless otherwise noted; (iii) All samples are assayed for PSP toxins; DA analyses are performed as needed (i.e., on the basis of detected blooms of the diatoms that produce DA); (iv) Please refer to the appropriate figure key for an explanation of the symbols used on the maps.

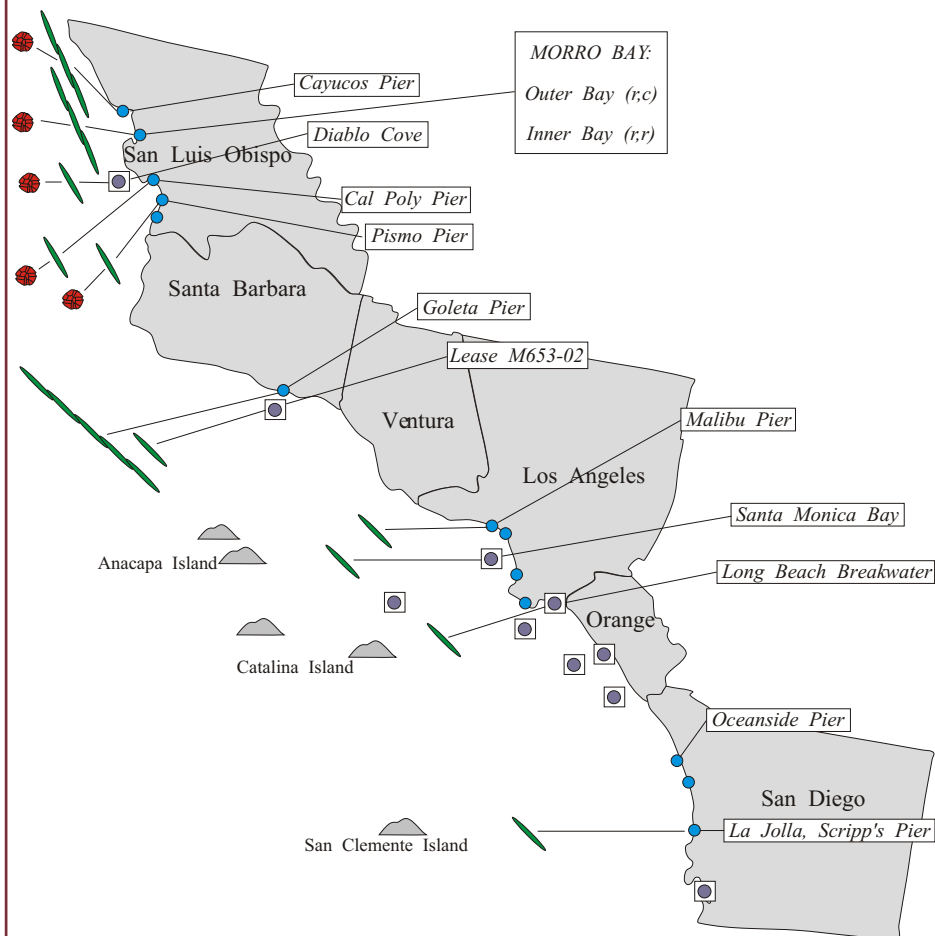
Southern California Summary:

Paralytic Shellfish Poisoning

Alexandrium distribution and abundance was significantly reduced from observations in July. This dinoflagellate was observed only

(Continued on Page 2)

Figure 1. Distribution of toxin-producing phytoplankton in Southern California during August, 2004.



Relative Abundance of Known Toxin Producers

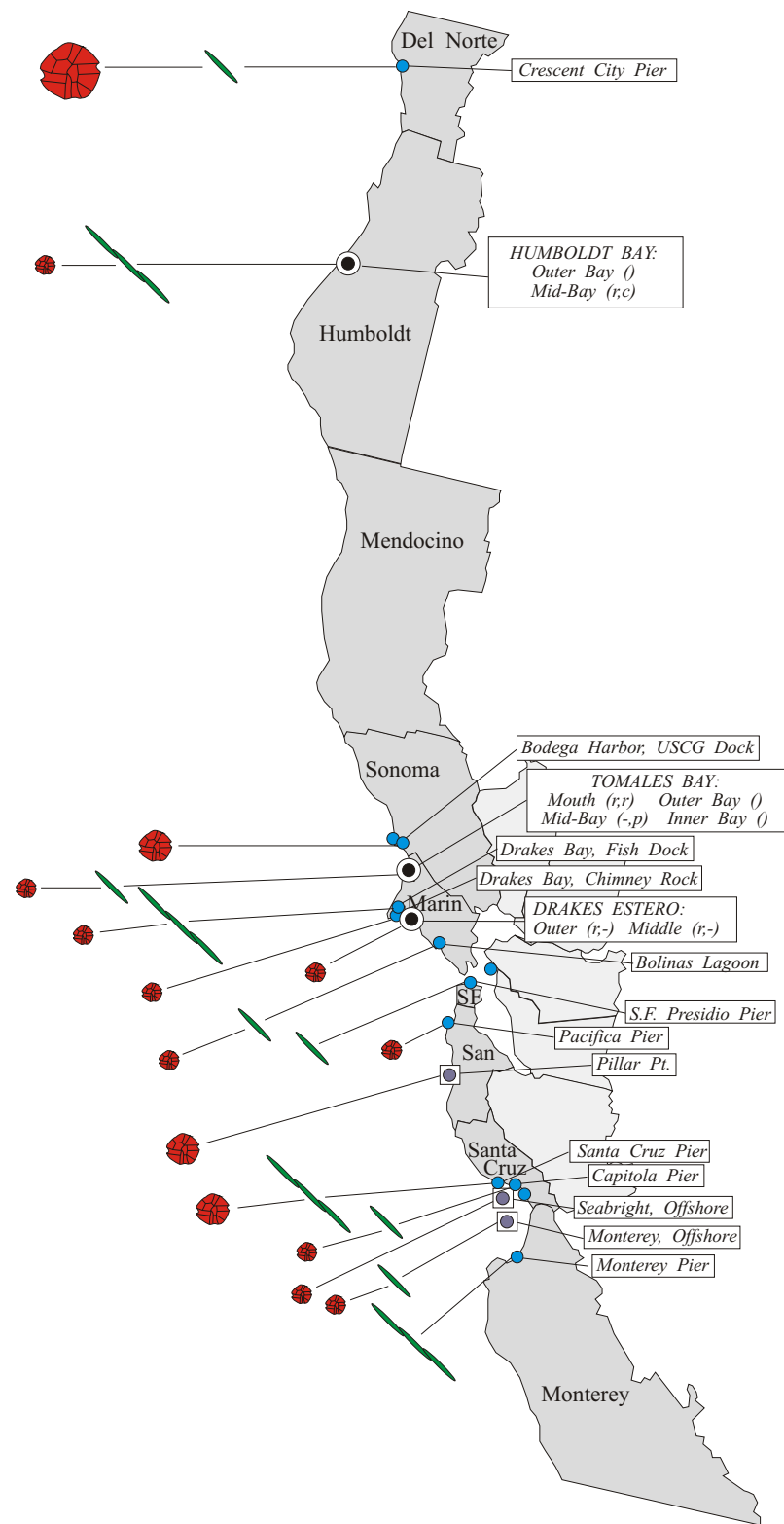
Alexandrium Species		Pseudo-nitzschia Species	
	Rare (less than 1%)		Present (less than 10%)
	Present (between 1% and 10%)		Common (between 10% and 50%)
	Common (between 10% and 50%)		Abundant (greater than 50%)
	Abundant (greater than 50%)		

MONTHLY SAMPLING STATIONS:

- Single Sampling Station
- Multiple Sampling Stations
- Offshore Sampling Station

For areas with multiple sampling stations, species abundance at each station is represented as follows:
(a,p) = Abundance for *Alexandrium* and *Pseudo-nitzschia*.
e.g., (c,p) = common, present; (a,-) = abundant, not observed

Figure 2. Distribution of toxin-producing phytoplankton in Northern California during August, 2004.



(Continued from Page 1)

along the San Luis Obispo coast in August (Figure 1).

Coinciding with the decrease in *Alexandrium* at San Luis Obispo sites, the concentration of PSP toxins decreased throughout this region (Figure 3). Low concentrations of PSP toxins persisted in sentinel mussels inside Morro Bay throughout the month. A mussel sample from Vandenberg also contained a low level of PSP toxins at the end of the month.

Domoic Acid

Pseudo-nitzschia was observed along the entire Southern California coast in August (Figure 1). For most regions the relative abundance was lower than observed in July. The highest relative abundance was observed in Santa Barbara at Goleta Pier, peaking by August 18 (60%) and quickly declining to less than 1% of the assemblage by the end of the month.

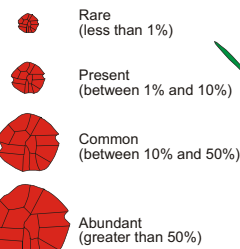
Non-toxic Species

The San Luis Obispo coast was dominated by a mixture of diatoms (*Coscinodiscus*, *Chaetoceros*) and dinoflagellates (*Prorocentrum*, *Ceratium*) in the Cayucos and Morro Bay region. Dinoflagellates were dominant further south at sites offshore of Diablo Canyon, at Avila, and at Pismo Pier. *Ceratium furca* was abundant at these sites.

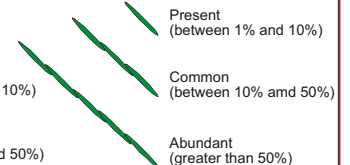
(Continued on Page 3)

Relative Abundance of Known Toxin Producers

Alexandrium Species



Pseudo-nitzschia Species



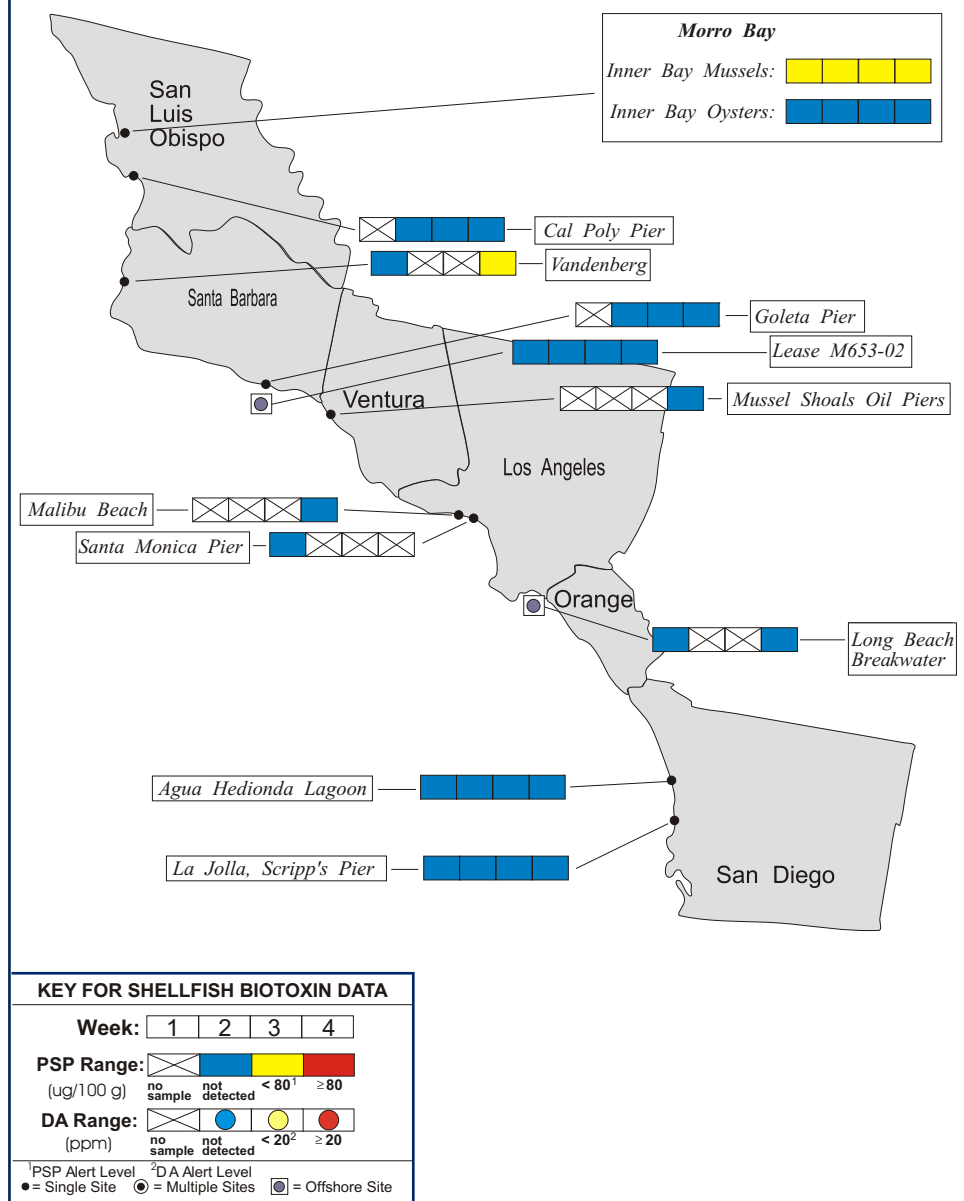
MONTHLY SAMPLING STATIONS:

- Single Sampling Station
- Multiple Sampling Stations
- Offshore Sampling Station

For areas with multiple sampling stations, species abundance at each station is represented as follows:

(A,P) = Abundance for *Alexandrium* and *Pseudo-nitzschia*.
e.g., (c,p) = common, present; (a,-) = abundant, not observed

Figure 3. Distribution of shellfish biotoxins in Southern California during August, 2004.



(Continued from Page 2)

By the end of the month the unarmored dinoflagellate *Cochlodinium*, which had created massive red tides in the Santa Cruz region by late July, was abundant at Pismo (see the Northern California discussion on page 4 for more on this event). *Lingulodinium* was abundant along most of the coast between Santa Barbara and San Diego. The dinoflagellates *Ceratium*, *Prorocentrum*, and *Protopeperidinium* were also common at various sites in this region, as were the diatoms *Hemialus* and *Bacteriastrum*.

Northern California Summary:

Paralytic Shellfish Poisoning

Alexandrium was observed along most of the Northern California coastline in August (Figure 2). The relative abundance decreased at most sites compared to July's observations. The highest relative abundance of this dinoflagellate was observed at the Crescent City Pier in mid-August, although cell numbers were low.

The high concentrations of PSP toxins detected in sentinel mussels from the Santa Cruz Pier in July persisted through the first week of August (Figure 4). By August 11 the toxin level had decreased to 49 ug and was not detectable the following week. Low

(Continued on Page 4)

The Marine Biotoxin Monitoring and Control Program, managed by the California Department of Health Services, is a state-wide effort involving a consortium of volunteer participants. The shellfish sampling and analysis element of this program is intended to provide an early warning of shellfish toxicity by routinely assessing coastal resources for the presence of paralytic shellfish poisoning (PSP) toxins and domoic acid.

The Phytoplankton Monitoring Program is a state-wide program designed to detect toxin producing species of phytoplankton in ocean water before they impact the public. The phytoplankton monitoring and observation effort can provide an advanced warning of a potential toxic bloom, allowing us to focus sampling efforts in the affected area before California's valuable shellfish resources or the public health is threatened.

For More Information Please Call:
(510) 412-4635

For Recorded Biotoxin Information Call:
(800) 553-4133

(Continued from Page 3)

concentrations of PSP toxins were detected along most of the Northern California coast though mid-month. These toxins remained at low but detectable levels throughout the month in Drakes Estero.

Domoic Acid

Pseudo-nitzschia was observed along most of the Northern California coast in August (Figure 2). The relative abundance was greatest inside Monterey Bay at Santa Cruz, although cell numbers were not high. The high cell mass of this diatom observed at the end of July in Crescent City had decreased dramatically by mid-August.

Non-toxic Species

Red tides were reported in the Santa Cruz region by the end of July. Initially it was difficult to identify the causative organism because it did not survive handling and preservation. Photos of live cells taken by researchers at U.C. Santa Cruz allowed DHS to identify *Cochlodinium*, an unarmored dinoflagellate, as the cause of the red tides. This dinoflagellate is quite fragile, as the cells can rupture when passing through the plankton net. Samplers reported a slimy coating that clogged the nets. In addition, beachgoers in the Santa Cruz area complained of noxious odors during the bloom. This bloom appeared to move offshore, as cell numbers dropped nearshore while an offshore sample collected on August 28 by the Pacific Cetacean Group in Monterey Bay was dominated by this dinoflagellate.

By late July and early August *Cochlodinium* was observed at sites along the San Luis Obispo coast. By August 26 it was abundant at Pismo Pier, comprising 90% of the species composition.



Figure 4. Distribution of shellfish biotoxins in Northern California during August, 2004.

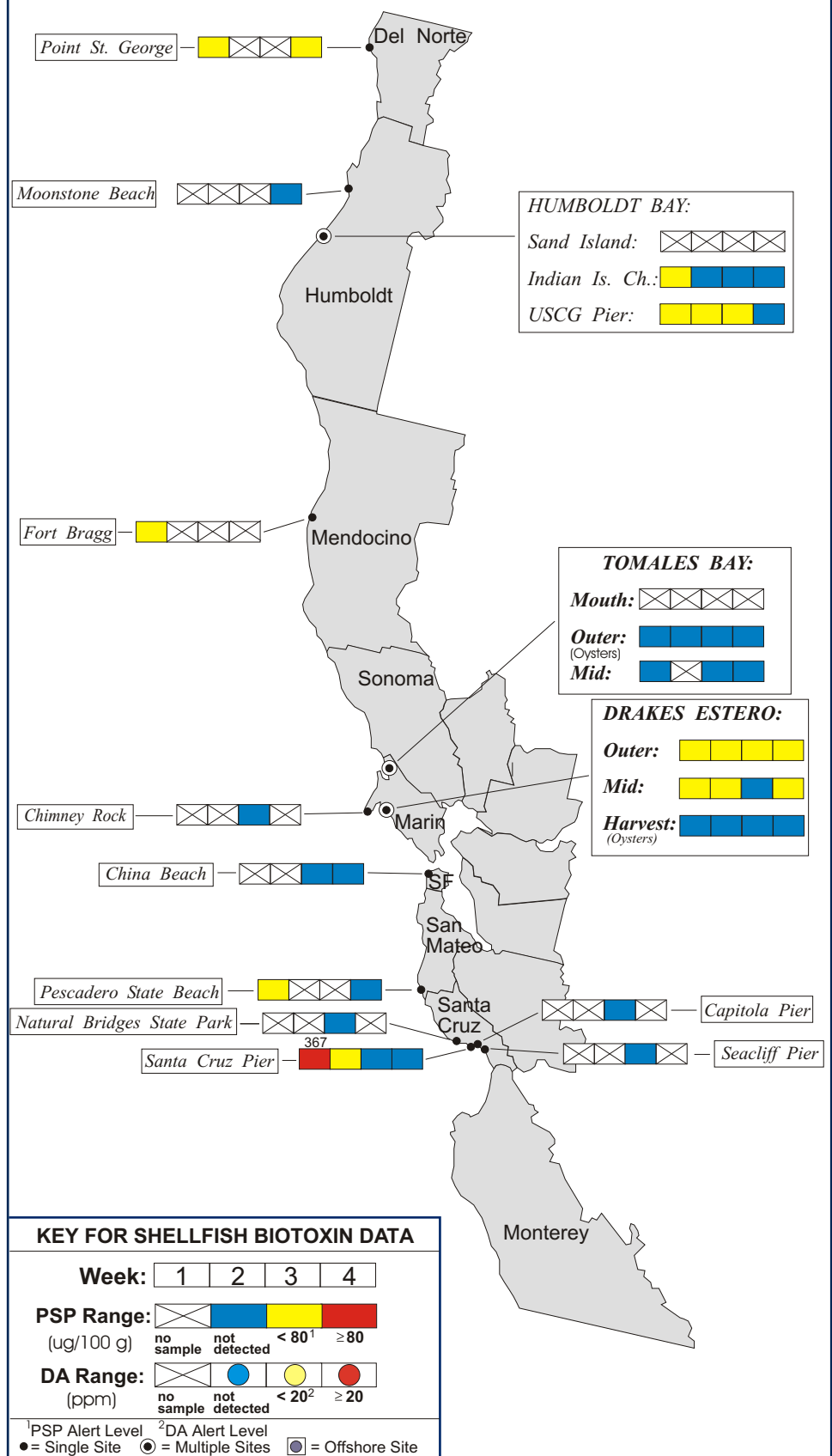


Table 1. California Marine Biotoxin Monitoring Program participants submitting shellfish samples during August, 2004.

COUNTY	AGENCY	# SAMPLES
Del Norte	Del Norte County Health Department	2
Humboldt	Coast Seafood Company	10
	Humboldt County Environmental Health Department	1
Mendocino	Mendocino County Environmental Health Department	1
Sonoma	None Submitted	
Marin	Cove Mussel Company	3
	CDHS Marine Biotoxin Monitoring Program	1
	Hog Island Oyster Company	4
	Johnson Oyster Company	20
	Marin Oyster Company	3
San Francisco	San Francisco County Health Department	2
San Mateo	San Mateo County Environmental Health Department	2
Santa Cruz	U.C. Santa Cruz	4
	Santa Cruz County Environmental Health Department	3
Monterey	None Submitted	
San Luis Obispo	Williams Shellfish Company	12
	U.C. Santa Barbara Marine Science Institute	4
Santa Barbara	Santa Barbara Mariculture Company	4
	U.C. Santa Barbara Marine Science Institute	3
	Vanderberg Air Force Base	2
Ventura	None Submitted	
Los Angeles	Los Angeles County Health Department	1
	Aquarium of the Pacific Long Beach	4
	Los Angeles Regional Water Quality Control Board	1
Orange	None Submitted	
San Diego	Carlsbad Aquafarms, Inc.	5
	Scripps Institute of Oceanography	4

QUARANTINES:

The health advisory issued by the State Health Director on June 10 remained in effect. This advisory warned consumers to avoid eating sport-harvested shellfish from Humboldt and Del Norte counties and was the result of dangerous levels of domoic acid in razor clams collected from this region.

The annual quarantine on the sport-harvesting of mussels went into effect on April 23, one week ahead of the normal May 1 start date. This action was taken as a result of elevated levels of domoic acid in Santa Cruz County and, subsequently, along the Santa Barbara coast.

The annual mussel quarantine applies only to sport-harvested mussels along the entire California coastline, including all bays and estuaries. This quarantine does not affect the commercial shellfish growing areas in California. All commercial shellfish growers certified by the State of California are required to submit routine samples for biotoxin analysis, allowing us to closely monitor for the occurrence of toxins. Harvesting closures are imposed if toxin levels reach the federal alert level.

Consumers of Washington clams, also known as butter clams, are cautioned to eat only the white meat. Persons taking any clams or scallops are advised to remove and discard the dark parts (i.e., the digestive organs or viscera).

Contact the "Biotoxin Information Line" at 1-800-553-4133 or (510) 412-4643 for a current update on marine biotoxin activity.



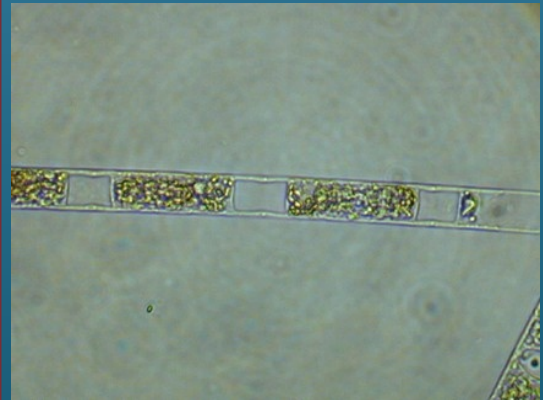
Table 2. Agencies, organizations and volunteers participating in marine phytoplankton sample collection during August, 2004.

COUNTY	AGENCY	# SAMPLES
Del Norte	Del Norte County Health Department	2
Humboldt	Coast Seafood Company	5
Mendocino	None Submitted	
Sonoma	Bodega Marine Laboratory	1
	DHS Volunteer (Cathleen Cannon)	1
Marin	CDHS Volunteers (Brent Anderson, Richard Plant, Cal Strobel)	10
	Johnson Oyster Company	10
	DHS Marine Biotoxin Monitoring Program	1
Contra Costa	DHS Marine Biotoxin Monitoring Program	1
San Francisco	CDHS Volunteer (Eugenia Mcnaughton)	4
	Gulf of the Farallones National Marine Sanctuary	1
San Mateo	San Mateo County Environmental Health Department	3
	CDHS Volunteer (Sandy Emerson)	1
Santa Cruz	Santa Cruz Environmental Health Department	3
	U.C. Santa Cruz	5
	Pacific Cetacean Group	1
	California Department of Parks and Recreation	2
Monterey	CDHS Volunteer (Jerry Norton)	1
	Pacific Cetacean Group	1
San Luis Obispo	CDHS Volunteers (Renee and Auburn Atkins)	4
	Morro Bay National Estuary Program	6
	Tenera Environmental	2
	U.C. Santa Barbara Marine Science Institute	6
	Morro Bay Natural History Museum	1
Santa Barbara	U.C. Santa Barbara Marine Science Institute	7
	Santa Barbara Mariculture Company	4
Ventura	None Submitted	
Los Angeles	Aquarium of the Pacific, Long Beach	4
	City of Los Angeles Environmental Monitoring Division	2
	Los Angeles County Sanitation District	5
	Los Angeles County Health Department	2
	CDHS Volunteer (Richard Weaver)	1
	Los Angeles Regional Water Quality Control Board	1
Orange	Orange County Sanitation District	6
	Ocean Institute	1
San Diego	CDHS Volunteer (Paul Sims)	3
	Scripps Institute of Oceanography	4

PHYTOPLANKTON GALLERY



Various zooplankton species occasionally make it into our samplers nets, such as this tiny hydrozoan collected in Santa Barbara.



The diatom *Hemialus* was common offshore in July, then increased in numbers at nearshore sites between Santa Barbara and San Diego.



The dinoflagellate *Ceratium* was common along much of the California coast in August.